



MONASH
University

MONASH
INFORMATION
TECHNOLOGY

Normalisation

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

FIT2094



Data Normalisation

- Relations should be normalised in order to avoid anomalies which may occur when inserting, updating and deleting data - operates at the **LOGICAL** level.
- Normalisation is a systematic series of steps for progressively refining the data model.
- A formal approach to analysing relations based on their primary key (or candidate keys) and functional dependencies.
- Used:
 - as a design technique "bottom up design", and
 - as a way of validating table structures produced via "top down design" (ER modelling)

Sample Data

FIGURE 6.1 Tabular representation of the report format

Table name: RPT_FORMAT

Database name: Ch06_ConstructCo

| PROJ_NUM | PROJ_NAME | EMP_NUM | EMP_NAME | JOB_CLASS | CHG_HOUR | HOURS |
|----------|--------------|---------|------------------------|-----------------------|----------|-------|
| 15 | Enterprise | 100 | Jane E. Abougl | Elect. Engineer | 84.50 | 23.8 |
| | | 101 | John G. News | Database Designer | 105.00 | 19.4 |
| | | 105 | Alice K. Johnson * | Database Designer | 105.00 | 35.7 |
| | | 106 | William Smithfield | Programmer | 35.75 | 12.6 |
| | | 109 | David M. Smith | Systems Analyst | 96.75 | 23.8 |
| 18 | Amber Wave | 114 | Annelise Jones | Applications Designer | 48.10 | 24.6 |
| | | 118 | James J. Frommer | General Support | 18.36 | 45.3 |
| | | 104 | Anne K. Ramoras * | Systems Analyst | 96.75 | 32.4 |
| | | 112 | Darlene M. Smithson | DSS Analyst | 45.95 | 44.0 |
| 22 | Rolling Tide | 105 | Alice K. Johnson | Database Designer | 105.00 | 64.7 |
| | | 104 | Anne K. Ramoras | Systems Analyst | 96.75 | 48.4 |
| | | 113 | Delbert K. Joenbrood * | Applications Designer | 48.10 | 23.6 |
| | | 111 | Geoff B. Wabash | Clerical Support | 26.87 | 22.0 |
| | | 106 | William Smithfield | Programmer | 35.75 | 12.8 |
| 25 | Starflight | 107 | Maria D. Alonzo | Programmer | 35.75 | 24.6 |
| | | 115 | Travis B. Bawangi | Systems Analyst | 96.75 | 45.8 |
| | | 101 | John G. News * | Database Designer | 105.00 | 56.3 |
| | | 114 | Annelise Jones | Applications Designer | 48.10 | 33.1 |
| | | 108 | Ralph B. Washington | Systems Analyst | 96.75 | 23.6 |
| | | 118 | James J. Frommer | General Support | 18.36 | 30.5 |
| | | 112 | Darlene M. Smithson | DSS Analyst | 45.95 | 41.4 |

Problems with data in Figure 6.1

- PROJ_NUM intended to be **primary key**, but it contains nulls
- JOB_CLASS invites **entry errors** eg. Elec. Eng. vs Elect. Engineer vs E.E.
- Table has **redundant data**
 - Details of a charge per hour are repeated for every occurrence of job class
 - Every time an employee is assigned to a project emp name repeated
- Relations that contain redundant information may potentially suffer from several update anomalies
 - Types of update anomalies include
 - **Insert Anomaly**
 - Insert a new employee only if they are assigned to a project
 - **Delete Anomaly**
 - Delete the last employee assigned to a project?
 - Delete the last employee of a particular job class?
 - **Modification (or update) Anomaly**
 - Update a job class hourly rate - need to update multiple rows

The Normalisation Process Goals

- Creating valid relations, i.e. each relation meets the properties of the relational model. In particular:
 - Entity integrity
 - Referential integrity
 - No many-to-many relationship
 - Each cell contains a single value (is atomic).
- In practical terms:
 - Each table represents a single subject
 - No data item will be unnecessarily stored in more than one table.
 - The relationship between tables can be established (pair of PK and FK is identified).
 - Each table is void of insert, update and delete anomalies.

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

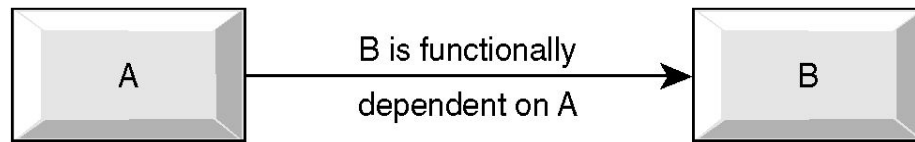
Representing a form as a relation

| CUSTOMER ORDER | | | |
|---|-------------|-----------------------|------------|
| Order Number: 61384 | | Order Date: 12/3/2018 | |
| Customer Number: 1273 | | | |
| Customer Name: Computer Training Centre | | | |
| Customer Address: 123 Excellent St Monash, Vic. 3000 | | | |
| PART NUMBER | DESCRIPTION | QTY ORDERED | LINE PRICE |
| M128 | Bookcase | 4 | 800 |
| B381 | TV Cabinet | 2 | 600 |
| R210 | Round Table | 3 | 1500 |

ORDER (orderno, orderdate, custnumb, custname, custaddress
(partno, partdesc, qtyordered, lineprice))

- Note this is **not** a relation
- (partno, partdesc, qtyordered, lineprice) - is a multivalued set of attributes – called a repeating group in normalisation terminology

Functional Dependency Revisited



- An attribute B is FUNCTIONALLY DEPENDENT on another attribute A, if a value of A determines a single value of B at any one time.
 - $A \rightarrow B$
 - $EMP\# \rightarrow EMP_NAME$
 - $CUSTNUMB \rightarrow CUSTNAME$
 - $ORDER-NUMBER \rightarrow ORDER-DATE$
 - ORDER-NUMBER - independent variable, also known as the DETERMINANT
 - ORDER-DATE - dependent variable
- TOTAL DEPENDENCY
 - attribute A determines B AND attribute B determines A
 - $EMPLOYEE-NUMBER \rightarrow TAX-FILE-NUMBER$
 - $TAX-FILE-NUMBER \rightarrow EMPLOYEE-NUMBER$

Functional Dependency

- For a **composite** PRIMARY KEY, it is possible to have FULL or PARTIAL dependency.
- FULL DEPENDENCY
 - occurs when an attribute is always dependent on all attributes in the composite PK
 - ORDER-NUMBER, PART-NUMBER → QTY-ORDERED
- Lack of full dependency for multiple attribute key = PARTIAL DEPENDENCY
 - ORDER-NUMBER, PART-NUMBER → QTY-ORDERED, PART-DESCRIPTION
 - here although qty-ordered is **fully dependent** on order-number and part-number, *only* part-number is required to determine part-description
 - part-description is said to be **partially dependent** on order-number and part-number

Functional Dependency

- TRANSITIVE DEPENDENCY

- occurs when Y depends on X, and Z depends on Y - thus Z also depends on X ie. $X \rightarrow Y \rightarrow Z$
- **and** Y is not a candidate key (or part of a candidate key)
- ORDER-NUMB \rightarrow CUSTOMER-NUMB \rightarrow CUSTOMER-NAME

- Dependencies are depicted with the help of a **Dependency Diagram**.
- Normalisation converts a relation into relations of progressively smaller number of attributes and tuples until an optimum level of decomposition is reached - little or no data redundancy exists.
- The output from normalisation is a set of relations that meet all conditions set in the relational model principles.

PROJECT - REPRESENTATION 1

| PROJ_NUM | PROJ_NAME | EMP_NUM | EMP_NAME | JOB_CLASS | CHG_HOUR | HOURS |
|----------|--------------|---------|------------------------|-----------------------|----------|-------|
| 15 | Evergreen | 103 | June E. Arbough | Elect. Engineer | 84.50 | 23.80 |
| | | 101 | John G. News | Database Designer | 105.00 | 19.40 |
| | | 105 | Alice K. Johnson * | Database Designer | 105.00 | 35.70 |
| | | 106 | William Smithfield | Programmer | 35.75 | 12.60 |
| | | 102 | David H. Senior | Systems Analyst | 96.75 | 23.80 |
| 18 | Amber Wave | 114 | Annelise Jones | Applications Designer | 48.10 | 24.60 |
| | | 118 | James J. Frommer | General Support | 18.36 | 45.30 |
| | | 104 | Anne K. Ramoras * | Systems Analyst | 96.75 | 32.40 |
| | | 112 | Darlene M. Smithson | DSS Analyst | 45.95 | 44.00 |
| 22 | Rolling Tide | 105 | Alice K. Johnson | Database Designer | 105.00 | 64.70 |
| | | 104 | Anne K. Ramoras | Systems Analyst | 96.75 | 48.40 |
| | | 113 | Delbert K. Joenbrood * | Applications Designer | 48.10 | 23.60 |
| | | 111 | Geoff B. Wabash | Clerical Support | 26.87 | 22.00 |
| | | 106 | William Smithfield | Programmer | 35.75 | 12.80 |
| 25 | Starflight | 107 | Maria D. Alonzo | Programmer | 35.75 | 24.60 |
| | | 115 | Travis B. Bawangi | Systems Analyst | 96.75 | 45.80 |
| | | 101 | John G. News * | Database Designer | 105.00 | 56.30 |
| | | 114 | Annelise Jones | Applications Designer | 48.10 | 33.10 |
| | | 108 | Ralph B. Washington | Systems Analyst | 96.75 | 23.60 |
| | | 118 | James J. Frommer | General Support | 18.36 | 30.50 |
| | | 112 | Darlene M. Smithson | DSS Analyst | 45.95 | 41.40 |

Assignment Project Exam Help

EMPLOYEE PROJECT ASSIGNMENT - REPRESENTATION 2

| PROJ_NUM | PROJ_NAME | EMP_NUM | EMP_NAME | JOB_CLASS | CHG_HOUR | HOURS |
|----------|--------------|---------|------------------------|-----------------------|----------|-------|
| 15 | Evergreen | 103 | June E. Arbough | Elect. Engineer | 84.50 | 23.80 |
| 15 | Evergreen | 101 | John G. News | Database Designer | 105.00 | 19.40 |
| 15 | Evergreen | 105 | Alice K. Johnson * | Database Designer | 105.00 | 35.70 |
| 15 | Evergreen | 106 | William Smithfield | Programmer | 35.75 | 12.60 |
| 15 | Evergreen | 102 | David H. Senior | Systems Analyst | 96.75 | 23.80 |
| 18 | Amber Wave | 114 | Annelise Jones | Applications Designer | 48.10 | 24.60 |
| 18 | Amber Wave | 118 | James J. Frommer | General Support | 18.36 | 45.30 |
| 18 | Amber Wave | 104 | Anne K. Ramoras * | Systems Analyst | 96.75 | 32.40 |
| 18 | Amber Wave | 112 | Darlene M. Smithson | DSS Analyst | 45.95 | 44.00 |
| 22 | Rolling Tide | 105 | Alice K. Johnson | Database Designer | 105.00 | 64.70 |
| 22 | Rolling Tide | 104 | Anne K. Ramoras | Systems Analyst | 96.75 | 48.40 |
| 22 | Rolling Tide | 113 | Delbert K. Joenbrood * | Applications Designer | 48.10 | 23.60 |
| 22 | Rolling Tide | 111 | Geoff B. Wabash | Clerical Support | 26.87 | 22.00 |
| 22 | Rolling Tide | 106 | William Smithfield | Programmer | 35.75 | 12.80 |
| 25 | Starflight | 107 | Maria D. Alonzo | Programmer | 35.75 | 24.60 |
| 25 | Starflight | 115 | Travis B. Bawangi | Systems Analyst | 96.75 | 45.80 |
| 25 | Starflight | 101 | John G. News * | Database Designer | 105.00 | 56.30 |
| 25 | Starflight | 114 | Annelise Jones | Applications Designer | 48.10 | 33.10 |
| 25 | Starflight | 108 | Ralph B. Washington | Systems Analyst | 96.75 | 23.60 |
| 25 | Starflight | 118 | James J. Frommer | General Support | 18.36 | 30.50 |
| 25 | Starflight | 112 | Darlene M. Smithson | DSS Analyst | 45.95 | 41.40 |

<https://powcoder.com>
Add WeChat powcoder

Unnormalised Form (UNF)

- **Identify a “subject” that needs to be modelled**
 - For example from figure 6.1 possible “subjects” of interest:
 - **PROJECT** (we will call this representation 1)
 - **EMPLOYEE_PROJECT_ASSIGNMENT** (we will abbreviate this as **ASSIGNMENT** and will call this representation 2).
- Choose one subject of interest as a starting point and identify a primary key for this subject of interest.
 - For example for **PROJECT**, primary key would be **project _number** (or we will abbreviate it as **proj_num**).

First Normal Form

- FIRST NORMAL FORM (part of formal definition of a relation)
 - A RELATION IS IN FIRST NORMAL FORM (1NF) IF:
 - a unique primary key has been identified for each tuple/row.
 - it is a valid relation
 - Entity integrity (no part of PK is null)
 - Single value for each cell.
 - No repeating group.
 - all attributes are functionally dependent on all or part of the primary key

UNF to 1NF transformation

- Identify the repeating group(s), if any, in the unnormalised relation.
 - For representation 1, a project will have more than one employee assigned to it, hence there is a repeating group.
 - We have one-to-many relationship from PROJECT to EMPLOYEE.

**Q1. Is there any repeating group for the
ASSIGNMENT relation?**

Assignment Project Exam Help

A. Yes (what is it)? <https://powcoder.com>

B. No

Add WeChat powcoder

UNF Representations

- Representation 1:
 - PROJECT (proj_num, proj_name (emp_num, emp_name,))

Assignment Project Exam Help

- Representation 2:

<https://powcoder.com>

- ASSIGNMENT(proj_num, emp_num, proj_name, emp_name, job_class, ...)

Add WeChat powcoder

UNF to 1NF

- Move from UNF to 1NF by:
 1. identify a unique identifier for the repeating group.
[Assignment Project Exam Help](https://powcoder.com)
 2. *remove the repeating group* along with the PK of the main relation.
<https://powcoder.com>
 3. The PK of the new relation resulting from the removal of repeating group will *normally* have a composite PK made up of the PK of the main relation and the unique identifier chosen in 1. above, but this ***must be checked***.

UNF to 1NF (representation 1)

PROJECT (proj_num, proj_name)

ASSIGNMENT (proj_num, emp_num, emp_name,
job_class, chg_hour, assign_hours)

<https://powcoder.com>

Add WeChat powcoder

Q2. Assume that we have started with ASSIGNMENT as the chosen “subject” (representation 2) in UNF and its UNF is in the form of:

ASSIGNMENT(proj_num, emp_num, proj_name, emp_name, job_class, chg_hrs, assign_hours).

What would be the 1NF of this UNF relation?

- A. Two relations
 - PROJECT (proj_num, proj_name) and
 - ASSIGNMENT (proj_num, emp_num, emp_name, job_class, chg_hour, assign_hours)
- B. ASSIGNMENT (proj_num, emp_num, proj_name, emp_name, job_class, chg_hour, assign_hours)
- C. PROJECT (proj_num, proj_name)
- D. ASSIGNMENT (proj_num, emp_num, job_class, proj_name, emp_name, chg_hour, assign_hours)

1NF to 2NF

- A RELATION IS IN 2NF IF -
 - all non key attributes are functionally dependent on the **entire** primary key (simplified definition)
 - i.e. no partial dependencies exist
 - all non key attributes are functionally dependent on **any candidate key** (general definition)
 - for this unit we will only use the simplified definition ie. look for partial dependencies based on the primary key

Q3. Which of the following attributes has a partial dependency in the relation ASSIGNMENT?:

ASSIGNMENT(proj_num, emp_num, proj_name, emp_name, job_class, chg_hrs, assign_hours):

- <https://powcoder.com>
Add WeChat powcoder
- A. proj_name
 - B. emp_name
 - C. job_class
 - D. chg_hrs
 - E. assign_hours
 - F. More than one option is correct.

Q4. Which of the following attributes has a transitive dependency in the relation ASSIGNMENT?:

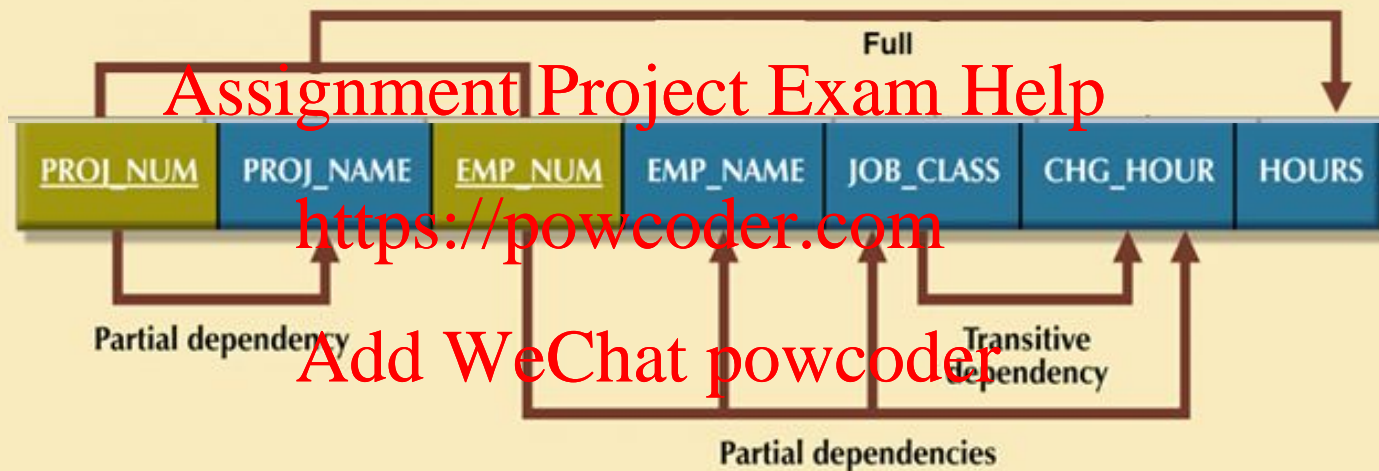
ASSIGNMENT(proj_num, emp_num, proj_name, emp_name, job_class, chg_hrs, assign_hours):

- <https://powcoder.com>
Add WeChat powcoder
- A. proj_name
 - B. emp_name
 - C. job_class
 - D. chg_hrs
 - E. assign_hours
 - F. More than one option is correct.

Representation 2: Dependency Diagram (1NF)

FIGURE 6.3

First normal form (1NF) dependency diagram



1NF (PROJ_NUM, EMP_NUM, PROJ_NAME, EMP_NAME, JOB_CLASS, CHG_HOURS, HOURS)

PARTIAL DEPENDENCIES:

(PROJ_NUM \Rightarrow PROJ_NAME)

(EMP_NUM \Rightarrow EMP_NAME, JOB_CLASS, CHG_HOUR)

TRANSITIVE DEPENDENCY:

(JOB_CLASS \Rightarrow CHG_HOUR)

FULL

proj_no, emp_no \rightarrow hours

1NF to 2NF Representation 1

- Move from 1NF to 2NF by removing partial dependencies
 - 1NF: PROJECT (proj_num, proj_name)
 - 1NF: ASSIGNMENT (proj_num, emp_num,
<https://powcoder.com>
emp_name, job_class, chg_hour, assign_hours)
- 1NF: PROJECT (proj_num, proj_name)
[Add WeChat powcoder](#)
 - already in 2NF only one attribute in PK thus CANNOT be any partial dependencies
 - 2NF: PROJECT (proj_num, proj_name)

1NF to 2NF (Representation 1)

- 1NF: ASSIGNMENT (proj_num, emp_num, emp_name, job_class, chg_hour, assign_hours)
 - emp_name, job_class and depend on emp_num (partial dependency), chg_hour depends on job_class (transitive).
 - These attributes need to be removed into a new relation.
 - Also include the part of PK that causes the partial dependency to be the PK of the new relation.
 - 2NF EMPLOYEE (emp_num, emp_name, job_class, chg_hour)
 - It leaves ASSIGN relation with the remaining attributes.
 - 2NF ASSIGNMENT (proj_num, emp_num, assign_hours)

2NF Representation 1

PROJECT (proj_num, proj_name)

EMPLOYEE (emp_num, emp_name, job_class,
assign_hours)

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

ASSIGNMENT (proj_num, emp_num,
assign_hours)

Q5. Where is the location of the FK for the relations below?

EMPLOYEE (emp_num, emp_name, job_class, chg_hour)

ASSIGNMENT (proj_num, emp_num, assign_hours)

PROJECT (proj_num, proj_name)

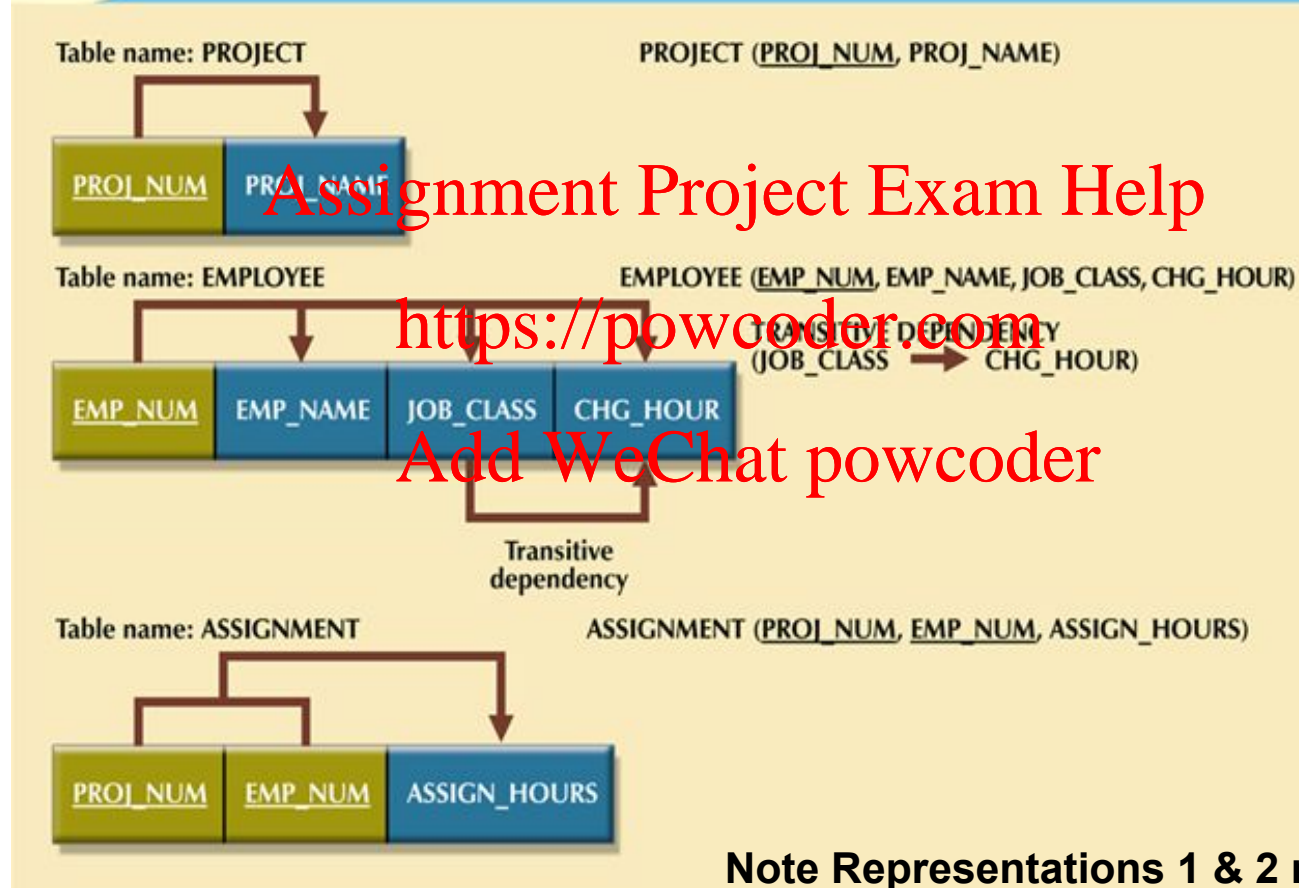
<https://powcoder.com>

- A. EMPLOYEE
- B. ASSIGNMENT
- C. PROJECT
- D. More than one answer is correct

2NF Conversion Results (Representations 1 & 2)

FIGURE 6.4

Second normal form (2NF) conversion results



**Q6. What type of relationship is the relationship between:
ASSIGNMENT and EMPLOYEE
and
ASSIGNMENT and PROJECT**

EMPLOYEE (emp_num, emp_name, job_class, chg_hour)
ASSIGNMENT (proj_num, emp_num, assign_hours)
PROJECT (proj_num, proj_name)

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

- A. non-identifying, non-identifying
- B. identifying, identifying
- C. identifying, non-identifying
- D. non-identifying, identifying

2NF to 3NF

- A RELATION IS IN 3NF IF -
 - all transitive dependencies have been removed
 - check for ***non key attribute dependent on another non key attribute***
- Move from 2NF to 3NF by removing transitive dependencies

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

2NF to 3NF

- PROJECT and ASSIGN already in 3NF
 - 3NF PROJECT (proj_num, proj_name)
 - 3NF ASSIGNMENT (proj_num, emp_num, assign_hours)
- 2NF EMPLOYEE (emp_num, emp_name, job_class, chg_hour)
 - It has transitive dependency job_class → chg_hour.
 - Remove the attributes with transitive dependency into a new relation.
 - The determinant will be an attribute in both the original and new relations (it will become the PK and FK relationship)
 - Assign the determinant to be the PK of the new relation.

2NF to 3NF

- After the removal of transitive dependency in EMPLOYEE, we have:
 - 3NF EMPLOYEE (emp_num, emp_name, job_class)
 - 3NF JOB (job_class, chg_hour)

Relations in 3NF

FIGURE 6.5

Third normal form (3NF) conversion results



Table name: PROJECT

PROJECT (PROJ_NUM, PROJ_NAME)

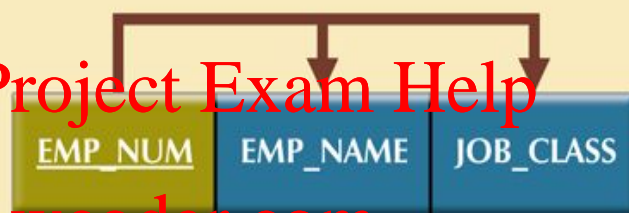


Table name: EMPLOYEE

EMPLOYEE (EMP_NUM, EMP_NAME, JOB_CLASS)



Table name: JOB

JOB (JOB_CLASS, CHG_HOUR)



Table name: ASSIGNMENT

ASSIGNMENT (PROJ_NUM, EMP_NUM, ASSIGN_HOURS)

Q7. Where is the location of the FK for the relations below?

EMPLOYEE (emp_num, emp_name, job_class)

JOB (job_class, chg_hour)

Assignment Project Exam Help

<https://powcoder.com>

A. EMPLOYEE

B. JOB Add WeChat powcoder

C. Both EMPLOYEE and JOB

Q8. What type of relationship is the relationship between the JOB and EMPLOYEE?

EMPLOYEE (emp_num, emp_name, job_class)

JOB (job_class, chg_hour)

Assignment Project Exam Help

<https://powcoder.com>

A. non-identifying

B. identifying

Add WeChat powcoder

C. Cannot be determined

Entire Process UNF to 3NF (representation 1)

- UNF
 - PROJECT (proj_num, proj_name (emp_num, emp_name, job_class, chg_hour, assign_hours))
- 1NF – remove repeating group
 - PROJECT (proj_num, proj_name)
 - ASSIGNMENT (proj_num, emp_num, emp_name, job_class, chg_hour, assign_hours)
- 2NF – remove partial dependencies
 - PROJECT (proj_num, proj_name)
 - EMPLOYEE (emp_num, emp_name, job_class, chg_hour)
 - ASSIGNMENT (proj_num, emp_num, assign_hours)
- 3NF – remove transitive dependencies
 - PROJECT (proj_num, proj_name)
 - EMPLOYEE (emp_num, emp_name, job_class)
 - ASSIGNMENT (proj_num, emp_num, assign_hours)
 - JOB (job_class, chg_hour)

Entire Process UNF to 3NF (representation 2)

- UNF
 - ASSIGNMENT (proj_num, emp_num, proj_name, emp_name, job_class, chg_hour, assign_hours)
- 1NF – remove repeating group
 - ASSIGNMENT (proj_num, emp_num, proj_name, emp_name, job_class, chg_hour, assign_hours) => 1NF is only identify PK, no repeating group.
- 2NF – remove partial dependencies
 - ASSIGNMENT (proj_num, emp_num, assign_hours)
 - PROJECT (proj_num, proj_name)
 - EMPLOYEE (emp_num, emp_name, job_class, chg_hour)
- 3NF – remove transitive dependencies
 - ASSIGNMENT (proj_num, emp_num, assign_hours)
 - PROJECT (proj_num, proj_name)
 - EMPLOYEE (emp_num, emp_name, job_class)
 - JOB (job_class, chg_hour)

Monash Software EMPLOYEE form

- List all attributes found on the form, maintain consistency with previously used attribute names if exist:
 - emp_no, emp_fname, emp_lname, emp_dob, emp_street_no, emp_street, emp_town, emp_pcode, phone_type, phone_no, degree_name, degree_institution, degree_year, fmemb_no, fmemb_name, fmemb_dob, skill_name
- Determine if any attribute is multivalued for a given entity instance
 - phone_type, phone_no, degree_name, degree_institution, degree_year, fmemb_no, fmemb_name, fmemb_dob, skill_name

Monash Software EMPLOYEE form continued

- Group multivalued attributes that are related and place in brackets

EMPLOYEE (emp_no, emp_fname, emp_lname, emp_dob,
emp_street_no, emp_street, emp_town, emp_pcode, (phone_type,
phone_no), (degree_name, degree_institution, degree_year),
(fmemb_no, fmemb_name, fmemb_dob), (skill_name))

- This is our beginning UNF
 - PK of main relation EMPLOYEE is emp_no
 - Four repeating groups to remove

Monash Software EMPLOYEE form continued

EMPLOYEE (emp_no, emp_fname, emp_lname, emp_dob,
emp_street_no, emp_street, emp_town, emp_pcode, (phone_type,
phone_no), (degree_name, degree_institution, degree_year),
(fmemb_no, fmemb_name, fmemb_dob), (skill_name))

1NF

EMPLOYEE (emp_no, emp_fname, emp_lname, emp_dob,
emp_street_no, emp_street, emp_town, emp_pcode)

EMP_PHONE (emp_no, phone_no, phone_type)

EMP_QUALIFICATION (emp_no, degree_name, degree_institution,
degree_year)

FAMILY_MEMBER (emp_no, fmemb_no, fmemb_name, fmemb_dob)

EMPLOYEE_SKILL (emp_no, skill_name)

Monash Software EMPLOYEE form continued

2NF

There are no partial dependencies, relations are in 2NF

Assignment Project Exam Help

EMPLOYEE (emp_no, emp_fname, emp_lname, emp_dob,
emp_street_no, emp_street, emp_town, emp_postcode)

EMP_PHONE (emp_no, phone_no, phone_type)

EMP_QUALIFICATION (emp_no, degree_name, degree_institution,
degree_year)

FAMILY_MEMBER (emp_no, fmemb_no, fmemb_name, fmemb_dob)

EMPLOYEE_SKILL (emp_no, skill_name)

Monash Software EMPLOYEE form continued

3NF

There are no transitive dependencies, relations are in 3NF

Assignment Project Exam Help

EMPLOYEE (emp_no, emp_fname, emp_lname, emp_dob,
emp_street_no, emp_street, emp_town, emp_postcode)

EMP_PHONE (emp_no, phone_no, phone_type)

EMP_QUALIFICATION (emp_no, degree_name, degree_institution,
degree_year)

FAMILY_MEMBER (emp_no, fmemb_no, fmemb_name, fmemb_dob)

EMPLOYEE_SKILL (emp_no, skill_name)

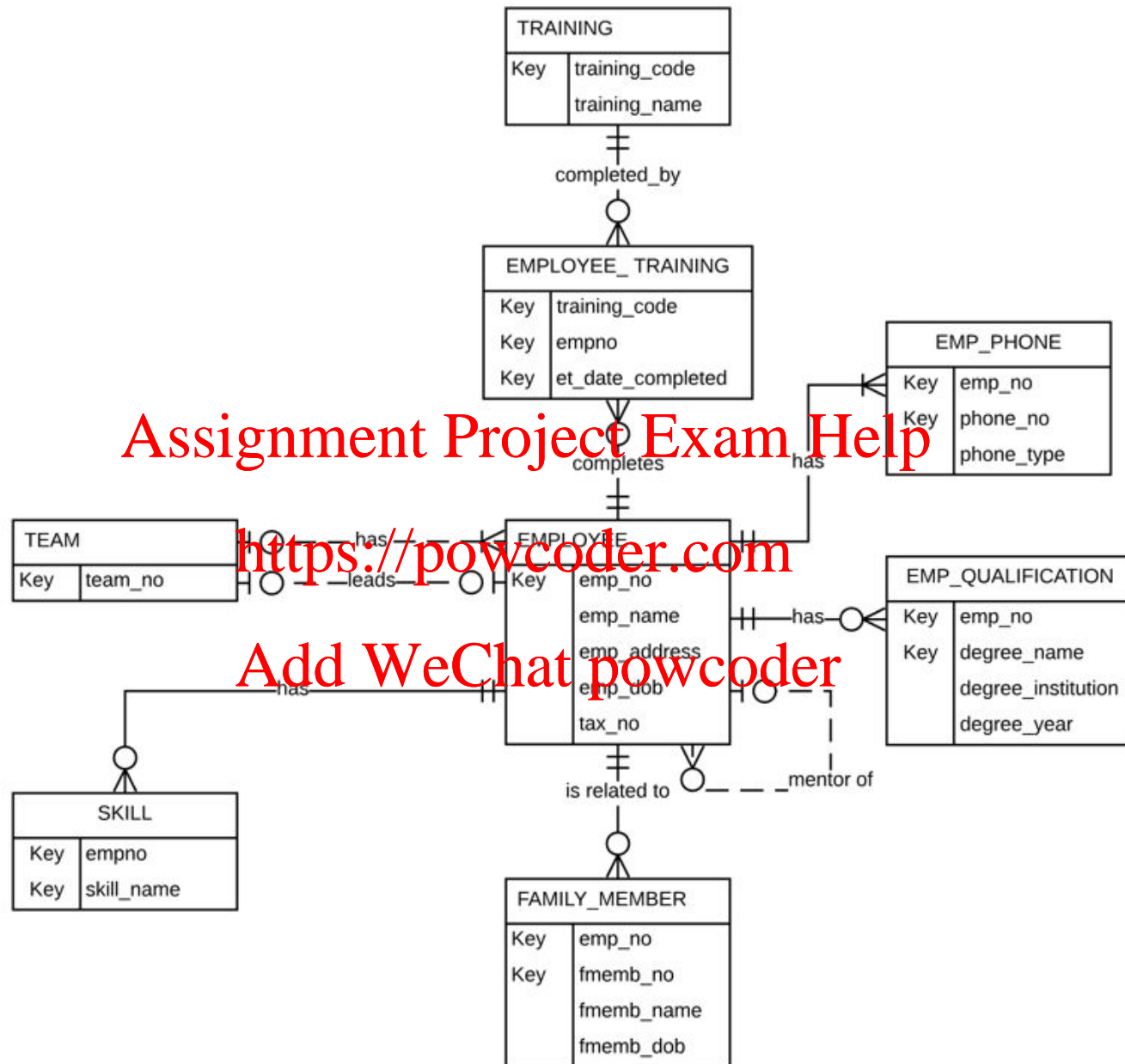
Consolidate 3NF relations and Logical Model

- Check to see whether a new relation has been discovered from the normalisation
- Check to see whether a new attribute has been discovered from the normalisation
- Check whether FKs are correctly identified
- Update Logical Model
 - Reflect changes back to Conceptual Model

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder



Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

Monash Software EMPLOYEE form continued

As we are operating at the logical level, surrogate keys may be added **AFTER** normalisation has been completed to improve design:

EMPLOYEE (emp_no, emp_fname, emp_lname, emp_dob, emp_street_no, emp_street, emp_town, emp_pcode)

EMP_PHONE (emp_no, phone_no, phone_type)

EMP_DEGREE (emp_no, degree_code, degree_year)

DEGREE (degree_code, degree_name, institution_code)

INSTITUTION (institution_code, institution_name)

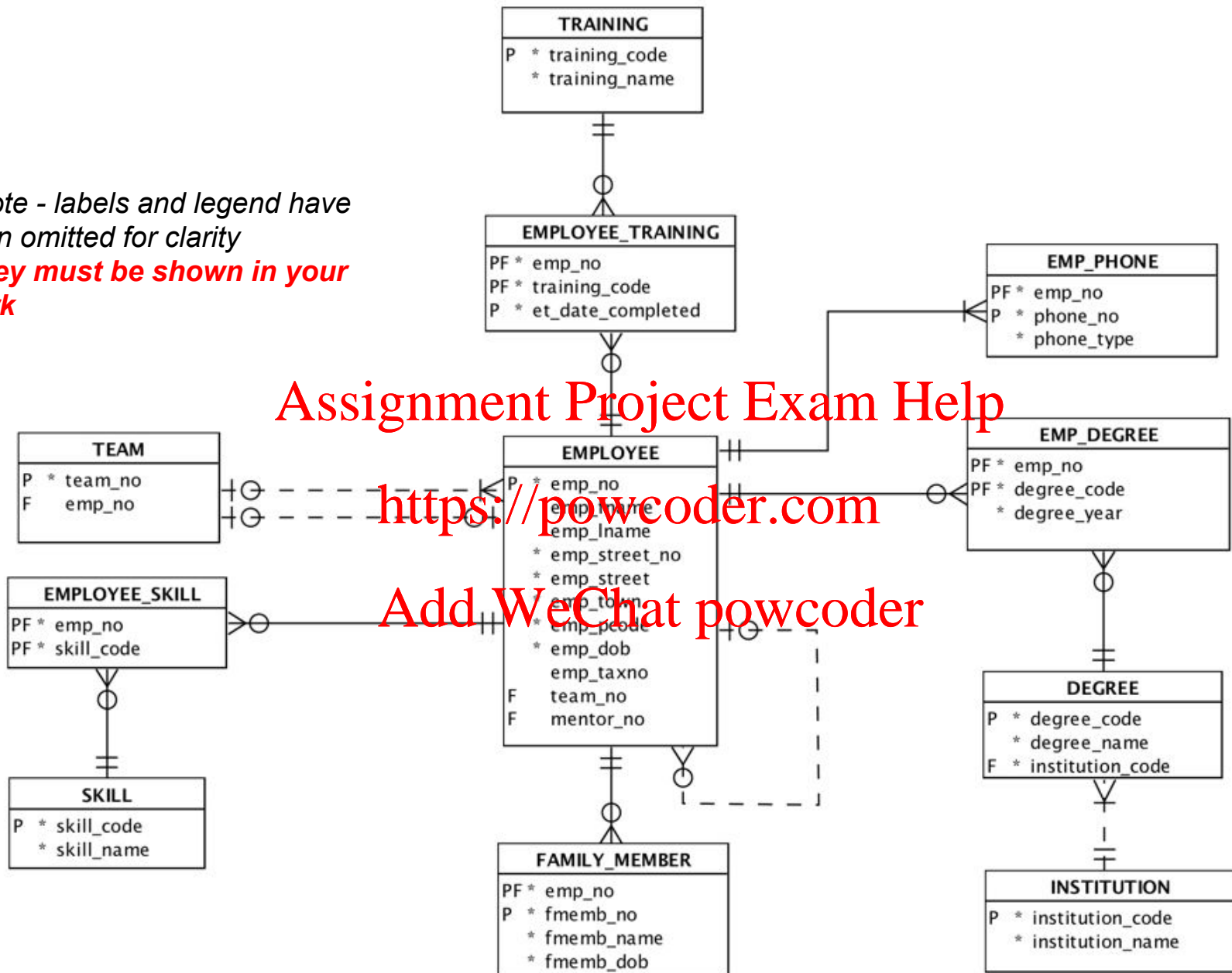
FAMILY_MEMBER (emp_no, fmemb_no, fmemb_name, fmemb_dob)

EMPLOYEE_SKILL (emp_no, skill_code)

SKILL (skill_code, skill_name)

These surrogate keys must not be reflected on your conceptual model

* Note - labels and legend have been omitted for clarity
 - **they must be shown in your work**



Assignment Project Exam Help
<https://powcoder.com>
 Add WeChat powcoder

Summary

- Things to remember
 - Primary Key selection in moving from UNF to 1NF is important, it will determine the starting point (choose your subject of interest).
 - Functional dependency.
 - Process of removing attributes in relations based on the concept of 1NF, 2NF and 3NF.
 - UNF to 1NF define PK & remove repeating group.
 - 1NF to 2NF remove partial dependency.
 - 2NF to 3NF remove transitive dependency.