rcl_normalisation- Team G186

task1 (three parts-A; B; C)

A：SAMPLE-A

(i) **ReadMore Community Library Catalogue Search Output:**

Sample A:

Call No:	005.74 C822D 2023
Title:	Database systems : design, implementation, and management
Authors	• **ID:** 2036 **Name:** Coronel, Carlos • **ID:** 4809 **Name:** Morris, Steven
Subjects:	• **ID:** 1045 **Description:** Database design • **ID:** 1044 **Description:** Database management • **ID:** 1040 **Description:** Databases
Contents:	Part I: Database Concepts-- 1. Database Systems -- 2. Data Models -- Part II: Design Concepts-- 3. The Relational Database Model -- 4. Entity Relationship (ER) Modeling -- 5. Advanced Data Modeling -- 6. Normalization of Database Tables -- Part III: Advanced Design and Implementation -- 7. Introduction to Structured Query Language (SQL) -- 8. Advanced SQL -- 9. Database Design -- Part IV: Advanced Database Concepts -- 10. Transaction Management and Concurrency Control -- 11. Database Performance Tuning and Query Optimization -- 12. Distributed Database Management Systems -- 13. Business Intelligence and Data Warehouses -- 14. Big Data Analytics and NoSQL -- Part V: Databases and the Internet -- 15. Database Connectivity and Web Technologies -- Part VI: Database Administration -- 16. Database Administration and Security.
Publisher:	**ID:** 1230 **Name:** Cengage Learning
Date Published:	2023
Edition	14th Edition
No pages:	816
Language:	English
Note:	Includes bibliographical references and index.
Identifiers:	• **ISBN:** 9780357673034 **Type:** Hardcover • **ISBN:** 9780357673072 **Type:** Loose Leaf

UNF

ENTRY (entry_call_no, entry_title, (author_id, author_fname, author_lname), (subject_id,

subject_desc), entry_contents, publisher_id, publisher_name, entry_publish_year, entry_edition,

entry_page_count, entry_language, entry_note, (book_isbn, book_type))

1NF

ENTRY (entry_call_no, entry_title, entry_contents, publisher_id, publisher_name,
entry_publish_year,entry_edition, entry_page_count, entry_language, entry_note)

CK: entry_call_no

AUTHORSHIP (entry_call_no, author_id, author_fname, author_lname)

CK: entry_call_no, author_id

ENTRY_SUBJECT (entry_call_no, subject_id, subject_desc)

CK: entry_call_no, subject_id

BOOK (book_isbn, entry_call_no, book_type)

CK: book_isbn

G186

Partial dependencies:

author_id --> author_fname, author_lname

subject_id --> subject_desc

2NF

ENTRY (entry_call_no, entry_title, entry_contents, publisher_id, publisher_name, entry_publish_year,entry_edition, entry_page_count, entry_language, entry_note)

AUTHORSHIP (entry_call_no, author_id)

ENTRY_SUBJECT (entry_call_no, subject_id)

BOOK (book_isbn, entry_call_no, book_type)

AUTHOR (author_id, author_fname, author_lname)

SUBJECT (subject_id, subject_desc)

Transitive dependencies:

publisher_id --> publisher_name

3NF

ENTRY (entry_call_no, entry_title, entry_contents, publisher_id, entry_publish_year, entry_edition, entry_page_count, entry_language, entry_note)

AUTHORSHIP (entry_call_no, author_id)

ENTRY_SUBJECT (entry_call_no, subject_id)

BOOK (book_isbn, entry_call_no, book_type)

AUTHOR (author_id, author_fname, author_lname)

SUBJECT (subject_id, subject_desc)

PUBLISHER (publisher_id, publisher_name)

Full dependencies:

entry_call_no --> entry_title, entry_contents, publisher_id, entry_publish_year, entry_edition,

entry_page_count, entry_language, entry_note

book_isbn --> entry_call_no, book_type

author_id --> author_fname, author_lname

subject_id --> subject_desc

publisher_id --> publisher_name

B: SAMPLE-B

Sample B:

Call No:	820.914 A211 A6/H 2002
Title:	The ultimate hitchhiker's guide to the galaxy
Authors:	• ID: 0231 Name: Adams, Douglas
Subjects:	• ID: 7321 Description: Science Fiction • ID: 7519 Description: Prefect, Ford (Fictitious character) • ID: 7520 Description: Dent, Arthur (Fictitious character)
Contents:	The hitchhiker's guide to the galaxy -- The restaurant at the end of the universe -- Life, the universe, and everything -- So long, and thanks for all the fish -- Young Zaphod plays it safe -- Mostly harmless.
Publisher:	ID: 0067 Name: Del Rey Books
Date Published:	2002
Edition	
No pages:	832
Language:	English
Note:	
Identifiers:	• ISBN: 9780345453747 Type: Paperback

(ii) ReadMore Community Library Borrowers Quarterly Report:

QUARTERLY BORROWER LOAN REPORT

Borrower No   1234   Report Date: 30 Jun 2024
Borrower
    First Name: Mary
    Last Name: Greenwood
Borrower Class   Adult
Borrowing Status   Permitted ☐
                        Banned ☑

Branch Code	Book Copy ID	Branch Name	Borrowed	Due Back	Returned	Fine Amnt	Date Fine Paid
100	2373	Clayton Central	02 Apr 2024 09:10	09 Apr 2024	07 Apr 2024 09:15		
100	4455	Clayton Central	15 Apr 2024 14:00	18 Apr 2024	20 Apr 2024 12:34	$4	20 Apr 2024
100	4901	Clayton Central	28 Apr 2024 10:00	4 May 2024	4 May 2024 10:21		
100	4455	Clayton Central	28 Apr 2024 11:10	4 May 2024	4 May 2024 11:06		
100	4216	Clayton Central	28 Apr 2024 10:15	4 May 2024	4 May 2024 10:09		
100	7536	Clayton Central	4 May 2024 10:00	11 May 2024	11 May 2024 10:20		
100	2373	Clayton Central	4 May 2024 12:30	11 May 2024	11 May 2024 09:10		
102	0372	West Riding	11 May 2024 13:00	18 May 2024	11 May 2024 09:16		
102	4455	West Riding	11 May 2024 13:05	18 May 2024	18 May 2024 12:15		

... multiple rows omitted ...

| 100 | 0876 | Clayton Central | 15 Jun 2024 13:15 | 16 Jun 2024 | 16 Jun 2024 16:10 | | |
| 102 | 2354 | West Riding | 20 Jun 2024 16:00 | 27 Jun 2024 | | | |

Note overdue loans are flagged in this report with:

Normalisation for Borrowers Quarterly Report

UNF

BORROWER (borrower_no, borrower_fname, borrower_lname, borrower_class, borrower_status,

(branch_code, copy_id, branch_name, loan_taken_datetime, loan_due_date,
loan_return_datetime,

fine_amount, fine_paydate))

1NF

G186

BORROWER (borrower_no, borrower_fname, borrower_lname, borrower_class, borrower_status)

CK: borrower_no

LOAN (borrower_no, loan_taken_datetime, branch_code, copy_id, branch_name, loan_due_date,loan_return_datetime, fine_amount, fine_paydate)

CKs:

- borrower_no, loan_taken_datetime
- branch_code, copy_id, loan_taken_datetime

Partial dependencies:

branch_code --> branch_name

2NF

BORROWER (borrower_no, borrower_fname, borrower_lname, borrower_class, borrower_status)

LOAN (borrower_no, loan_taken_datetime, branch_code, copy_id, loan_due_date, loan_return_datetime, fine_amount, fine_paydate)

BRANCH (branch_code, branch_name)

No transitive dependency present

3NF

BORROWER (borrower_no, borrower_fname, borrower_lname, borrower_class, borrower_status)

LOAN (borrower_no, loan_taken_datetime, branch_code, copy_id, loan_due_date, loan_return_datetime, fine_amount, fine_paydate)

BRANCH (branch_code, branch_name)

Full Dependencies:

- borrower_no --> borrower_fname, borrower_lname, borrower_class, borrower_status

- borrower_no, loan_taken_datetime --> branch_code, copy_id, loan_due_date,loan_return_datetime, fine_amount, fine_paydate
- branch_code --> branch_name

C:

Collected 3NF Relations

1. ENTRY (entry_call_no, entry_title, entry_contents, publisher_id, entry_publish_year, entry_edition,entry_page_count, entry_language, entry_note)

2. AUTHORSHIP (entry_call_no, author_id)

3. ENTRY_SUBJECT (entry_call_no, subject_id)

4. BOOK (book_isbn, entry_call_no, book_type)

5. AUTHOR (author_id, author_fname, author_lname)

6. SUBJECT (subject_id, subject_desc)

7. PUBLISHER (publisher_id, publisher_name)

8. BORROWER (borrower_no, borrower_fname, borrower_lname, borrower_class, borrower_status)

9. LOAN (borrower_no, loan_taken_datetime, branch_code, copy_id, loan_due_date,

loan_return_datetime, fine_amount, fine_paydate)

10. BRANCH (branch_code, branch_name)

Attribute Synthesis

We believe that for reasons of business logic they should constitute a separate entity

9. LOAN (borrower_no, loan_taken_datetime, branch_code, copy_id, loan_due_date, loan_return_datetime, fine_amount, fine_paydate)

to

LOAN (borrower_no, loan_taken_datetime, branch_code, copy_id,

loan_due_date,loan_return_datetime)

FINE (borrower_no, loan_taken_datetime, fine_amount, fine_paydate)

Final 3NF Relations

ENTRY (entry_call_no, entry_title, entry_contents, publisher_id, entry_publish_year, entry_edition,entry_page_count, entry_language, entry_note)

AUTHORSHIP (entry_call_no, author_id)

ENTRY_SUBJECT (entry_call_no, subject_id)

BOOK (book_isbn, entry_call_no, book_type)

AUTHOR (author_id, author_fname, author_lname)

SUBJECT (subject_id, subject_desc)

PUBLISHER (publisher_id, publisher_name)

BORROWER (borrower_no, borrower_fname, borrower_lname, borrower_class, borrower_status)

LOAN (borrower_no, loan_taken_datetime, branch_code, copy_id, loan_due_date,

loan_return_datetime)

FINE (borrower_no, loan_taken_datetime, fine_amount, fine_paydate)

BRANCH (branch_code, branch_name)