

Ku Ming Roong TP056110 DAS

by KU MING ROONG .

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Assignment Description	Database Assignment
Student Name	Ku Ming Roong (TP056110) Lee Kim Fai (TP055996) Wong Wei Shian Ryan (TP056455) Yat Wai Keong (TP056086)
Module Name and Code	AICT005-4-1 Database System
Lecturer's Name	Ms. Lai Chew Ping
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Disadvantage of file-based system

First, the disadvantage of the file-based system is data redundancy. Data redundancy will occur when the system has a repetition of data or duplicated files. It wastes the memory space of a system. For example, students will buy many reference books from the e-bookstore. Several data will be stored into the system. If the e-bookstore use file-based system, students record might be duplicated in many files. Thus, e-bookstore will face serious issues due to data redundancy. (Webmaster, 2011)

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Second, difficult to manage databases is one of the drawbacks of file-based system. E-bookstore Management staffs are difficult to find the records of students who bought books from E-bookstore because the data maybe storing at difference table. Thus, file-based system will bring many inconvenient to the management staff for managing the database of the system. For example, when a student buys many books from E-bookstore at a same time, many records will store into multiple database which happened data inconsistency. When the duplicated data stored in multiple databases, staffs are hard to allocate the data from the database and lead to difficulty in accessing data. (Webmaster, 2011)

Third, weakness of file-based system is time-consuming. Many processes are running at a same time in file-based system. So, the processing performance will become low and it takes more time to process. For instance, when students log in into E-bookstore website, it will take a long time to load into the pages. It is because many processes are running at a same time in the system and it leads to a low processing speed. Therefore, time wasted due to low processing speed. (Webmaster, 2011)

Advantages of DBMS

DBMS provides a lot of convenience for storing database. First, the advantage of DBMS is **reducing data redundancy**. In DBMS, all files should integrate in a single database. Therefore, each data is processed at a single location only once, so that duplicate data can be easily avoided. For example, a student may store duplicate data in e-bookstore records, but duplicate values would be removed when the records are converted to a single database. (Thakur, 2015)

Next, **good data security** is second benefit of DBMS for the e-bookstore. In a database, data security is vital concept. Data kept protected and safe from unauthorized changes in database. Only authorized users allow to access the database. For instance, identities of customers were authenticated with using their own username and password. Hence, DBMS always keep database tamperproof, secure and theft free. (Thakur, 2015)

Furthermore, the third advantage of DBMS is **data integrity**. Data integrity is very significant to e-bookstore because all data of e-bookstore must store accurately. In DBMS, it helps e-bookstore to manage their databases by ensuring the data are true and reliable. Therefore, e-bookstore can run their system well by storing data in DBMS. (Castro, 2018)

After that, **backup and recovery** also one of the benefits of DBMS. Database Management System automatically backup the database of e-bookstore within a period of time. If the system of e-bookstore crashed, DBMS can help to restore the database of e-bookstore to its previous condition. Therefore, e-bookstore will not lose any valuable data. (Castro, 2018)

Function of DBMS

DBMS brings many essential features to e-bookstore for ensuring data integrity and accuracy in the database. First, **data dictionary management** of DBMS plays an important role in the e-bookstore. Data dictionary help to check the various data components structures and relationships between the databases of e-bookstore. For instance, the configuration of the database that makes changes by the owner will automatically record in the data dictionary. Additionally, the data dictionary also provides the integration of data and eliminates structure and dependency from the system. (ASSIGNMENT Help, n.d.)

Besides, DBMS has the function of **security management**. DBMS of e-bookstore provides a security system on the database which enforces the customer data privacy and protection of the database. Security management ensures particular customers who able to access a database and what operations customer can conduct. For example, customers have to provide a username and password to access the e-bookstore database via biometric verification, such as retina scan or fingerprint. Security management also sets limits on private data that can be accessed by the customer. (FANDOM, 2009)

Furthermore, **data storage management** is the third function of DBMS for e-bookstore. This feature helps E-bookstore to handle the complex data structure of the database. By using the Data Storage management system, it provides data storage for data entry and data procedural code. Thus, data will be manipulated by DBMS automatically. Moreover, database performance tuning can be easily managed because all activities have been controlled by data storage management. Consequently, the database of E-bookstore will operate more effectively in terms of storage and access speed. (Thiru, n.d.)

Business Rule

- 1) Each CUSTOMER has to become a MEMBER before buying BOOKS.
- 2) One PUBLISHER can be associated with many BOOKS.
- 3) One PUBLISHER at least supply one BOOK, or else it will not be appeared in the publisher table.
- 4) Each BOOK can be associated with one PUBLISHER.
- 5) The RATING of each BOOK will not be affected by MEMBER's feedbacks.
- 6) One Book can be associated with many CART_DETAIL.
- 7) One BOOK can be associated with many ORDERED_DETAIL.
- 8) One INVOICE can be associated with many ORDERED_DETAIL.
- 9) One MEMBER can be associated with one CART.
- 10) One MEMBER can be associated with many INVOICES.
- 11) One MEMBER has to make payment to get their INVOICES.
- 12) One MEMBER will get one INVOICE for buying one BOOK.
- 13) If one MEMBER order BOOKS at different time, he will get multiple INVOICES.
- 14) One MEMBER is not allowed to refund when they receive their INVOICE.
- 15) One INVOICE can be associated with one DELIVERYID.
- 16) One DELIVERYID can deliver many BOOKS.
- 17) When BOOK successfully delivered, it will show DELIVERED in the delivery table, or else it will show PENDING.
- 18) One MEMBER must provide one FEEDBACK for each book which purchased from E-bookstore.
- 19) Once the MEMBER submitted the FEEDBACK, the FEEDBACK is not allowed to edit anymore.

Normalization

(UNF) Unnormalized form

¹ Member ID	Member Name	Book ID	Book Name	Price	Publisher ID	Publisher Name	InvoiceID	Delivery ID	Delivery Status	Total Book Ordered
M01	John	B01	Art of War	50	P01	Ali	I01	D01	Delivered	3
		B02	Homes	60	P02	Amin				
		B03	Friends	65	P01	Ali				
		B04	5 Wonders	70	P03	Abu	I02	D02	Pending	2
		B05	Fun Home	60	P02	Amin				
M02	Lee	B01	Art of War	50	P01	Ali	I03	D03	Delivered	3
		B03	Friends	65	P01	Ali				
		B04	5 Wonders	70	P03	Abu				

Step1 (1NF) First Normal Form

Member ID	Member Name	BookID	BookName	Price	Pub.ID	Pub.Name	Inv.ID	DeliveryID	Delivery Status	Total Book Ordered
M01	John	B01	Art of War	50	P01	Ali	I01	D01	Delivered	3
M01	John	B02	Homes	60	P02	Amin	I01	D01	Delivered	3
M01	John	B03	Friends	65	P01	Ali	I01	D01	Delivered	3
M01	John	B04	5 Wonders	70	P03	Abu	I02	D02	Pending	2
M01	John	B05	Fun Home	60	P02	Amin	I02	D02	Pending	2
M02	Lee	B01	Art of War	50	P01	Ali	I03	D03	Delivered	3
M02	Lee	B03	Friends	65	P01	Ali	I03	D03	Delivered	3
M02	Lee	B04	Five Wonders	70	P03	Abu	I03	D03	Delivered	3

Step 2 (2NF) Second Normal Form

1 Composite PK	Non-Key attributes	Check List	Action
MemberID & BookID	Member Name	MemberName depend on MemberID, not BookID)	Partial dependency exists. Remove MemberName together with its determinant (MemberID) to form a new table.
MemberID & BookID	BookName	BookName depend on BookID, not MemberID	Partial dependency exists. Remove BookName together with its determinant (BookID) to form a new table.
MemberID & BookID	Price	Price depend on BookID, not MemberID	Partial dependency exists. Remove Price together with its determinant (BookID) to form a new table.
MemberID & BookID	PublisherID	PublisherID depend on BookID, not MemberID	Partial dependency exists. Remove PublisherID together with its determinant (BookID) to form a new table.
MemberID & BookID	Publisher Name	PublisherName depend on BookID, not MemberID	Partial dependency exists. Remove PublisherName together with its determinant (BookID) to form a new table.
MemberID & BookID	InvoiceID	InvoiceID depend on both (MemberID & BookID)	Full dependency exists. InvoiceID remains in the original table with its determinant (MemberID & BookID) to form a new table.
MemberID & BookID	DeliveryID	DeliveryID depend on both (MemberID & BookID)	Full dependency exists. DeliveryID remains in the original table with its determinant (MemberID & BookID) to form a new table.
MemberID & BookID	Status of Delivery	Delivery Status depend on both (MemberID & BookID)	Full dependency exists. Delivery Status remains in the original table with its determinant (MemberID & BookID) to form a new table.
MemberID & BookID	Total Book Ordered	Total Book Ordered depend on both (MemberID & BookID)	Full dependency exists. Total Book Ordered remains in the original table with its determinant (MemberID & BookID) to form a new table.

(2NF) Second Normal Form

MemberID	MemberName
M01	John
M02	Lee

BookID	BookName	Price	PublisherID	PublisherName
B01	Art of War	50	P01	Ali
B02	Homes	60	P02	Amin
B03	Friends	65	P01	Ali
B04	5 Wonders	70	P03	Abu
B05	Fun Home	60	P02	Amin

MemberID	BookID	InvoiceID	DeliveryID	Status of Delivery	Total Book Ordered
M01	B01	I01	D01	Delivered	3
M01	B02	I01	D01	Delivered	3
M01	B03	I01	D01	Delivered	3
M01	B04	I02	D02	Pending	2
M01	B05	I02	D02	Pending	2
M02	B01	I03	D03	Delivered	3
M02	B03	I03	D03	Delivered	3
M02	B04	I03	D03	Delivered	3

(3NF) Third Normal Form

Transitive dependency : InvoiceID > BookID, InvoiceID> MemberID, InvoiceID > DeliveryID, BookID> PublisherID

Member

MemberID	MemberName
M01	John
M02	Lee

¹
Publisher

PublisherID	PublisherName
P01	Ali
P02	Amin
P03	Abu

Book

BookID	BookName	Price	PublisherID
B01	Art of War	50	P01
B02	Homes	60	P02
B03	Friends	65	P01
B04	5 Wonders	70	P03
B05	Fun Home	60	P02

Delivery

DeliveryID	Status of Delivery
D01	Delivered
D02	Pending
D03	Delivered

Invoice

InvoiceID	MemberID	DeliveryID	Total Book Ordered
I01	M01	D01	3
I02	M01	D02	2
I03	M02	D03	3

Ordered_Details

InvoiceID	BookID
I01	B01
I01	B02
I01	B03
I02	B04
I02	B05
I03	B01
I03	B03
I03	B04

Table in Database Server

Member

MemberID(PK)	MemberName
M01	John
M02	Lee

¹
Publisher

PublisherID(PK)	PublisherName
P01	Ali
P02	Amin
P03	Abu

Book

BookID (PK)	BookName	Price	PublisherID (FK)
B01	Art of War	50	P01
B02	Homes	60	P02
B03	Friends	65	P01
B04	5 Wonders	70	P03
B05	Fun Home	60	P02

Delivery

DeliveryID(PK)	Status of Delivery
D01	Delivered
D02	Pending
D03	Delivered

Invoice

InvoiceID(PK)	MemberID(FK)	DeliveryID(FK)	Total Book Ordered
I01	M01	D01	3
I02	M01	D02	2
I03	M02	D03	3

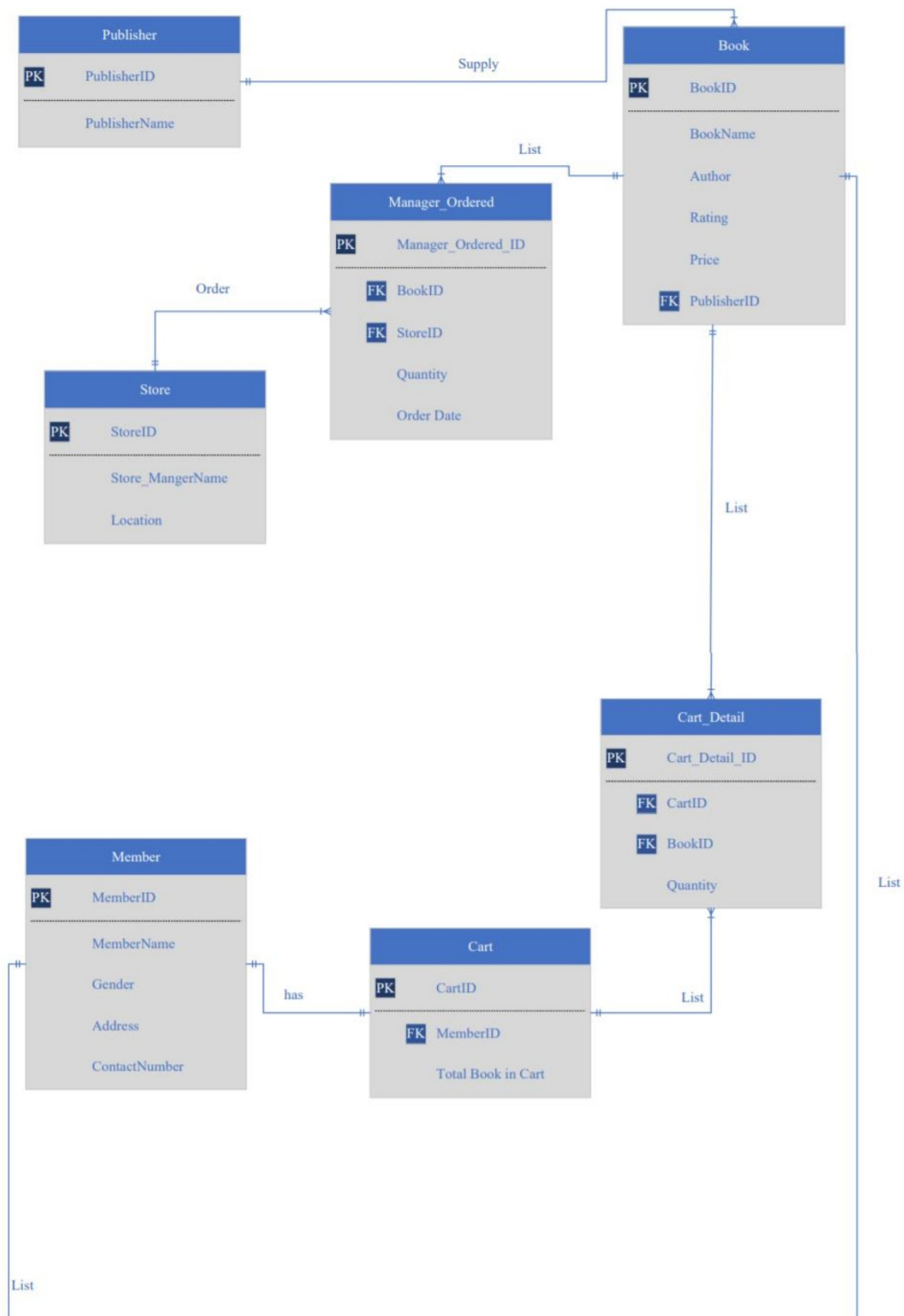
Ordered_Details

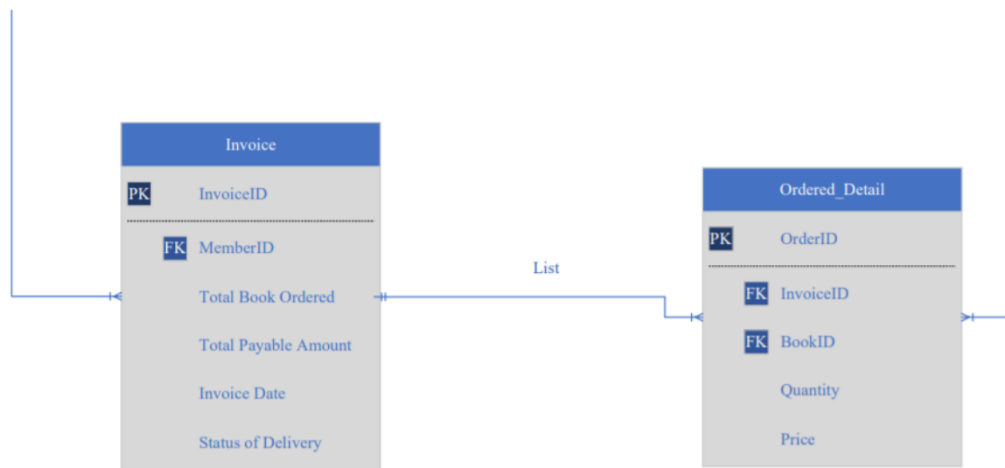
ID(PK)	InvoiceID(FK)	BookID(FK)
001	I01	B01
002	I01	B02
003	I01	B03
004	I02	B04
005	I02	B05
006	I03	B01
007	I03	B03
008	I03	B04

Primary Key: MemberID, BookID, PublisherID, InvoiceID, DeliveryID, ID

Foreign Key: MemberID, BookID, PublisherID, InvoiceID, DeliveryID

ERD





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